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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/159,397 | 09/23/1998 | SAU C. WONG | M-10296 US | 5079 |

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|---|---|
| WHIPKEY, JASON T | |
| **ART UNIT** | **PAPER NUMBER** |
| 2612 | 19 |

DATE MAILED: 10/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/159,397 | WONG ET AL. | |
| | Examiner | Art Unit | |
| | Jason T. Whipkey | 2612 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *15 July 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *15 and 24* is/are allowed.

6)☒ Claim(s) *1-14,16-23,25 and 26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 May 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 15 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

## DETAILED ACTION

### *Drawings*

1. The replacement drawing sheet was received on May 19, 2003. This drawing is approved.

2. The amendments to the specification to overcome the objections to the drawings are approved and the objections are withdrawn.

### *Specification*

3. The amendment to the specification is approved and the corresponding objection is withdrawn.

### *Claim Objections*

4. The amendments to the claims in response to the objection to the claims are approved and the corresponding objections are withdrawn.

### *Claim Rejections - 35 USC § 112*

5. The amendments to the claims in response to the rejection under 35 U.S.C. § 112, second paragraph, are approved and the corresponding rejections are withdrawn.

### *Response to Arguments*

6. Applicant's argument with respect to claim 1 has been considered but is moot in view of the new ground of rejection.

With regard to Applicant's assertion that the identification of sample and hold element 18 in the Roberts reference is inconsistent among claims 1, 4, and 12, the examiner wishes to point out that the prior Office action stated, "[n]ote that the sample-and-hold circuitry 18 omitted from Figure 2 is shown in Figure 5A" merely to point out that figures 2 and 5A are part of the same embodiment, despite the parts missing from Figure 2 that are shown in Figure 5A. In the rejection of claim 12, sample-and-hold circuitry 18 corresponds to the claimed memory and image processing and pixel buffer 10, frame buffer 11, and compression processor 12 correspond to the claimed image processing and compression circuits.

As noted in the rejection of claim 4 (but omitted from the rejection of claim 12), A/D converters 8 are also part of the claimed image processing circuits.

7. Applicant's arguments in response to the rejection of claim 18 have been fully considered but they are not persuasive.

As described in the previous item, sample-and-hold circuitry 18 stores the analog data and transmits the analog data to A/D converters 8 so that digital image processing can be performed. In other words, when comparing Roberts's Figure 5A to Figure 2 in the instant application, sample-and-hold circuitry 18 corresponds to memory 210, A/D converters 8 correspond to A/D converter 120, and circuits 10-12 correspond to image processor and compressor 130.

Contrary to Applicant's suggestion, it is irrelevant that sample-and-hold circuitry 18 is part of A/D converters 8.

With regard to Applicant's assertion that Roberts does not teach that an entire image is stored in sample-and-hold circuitry 18, it is noted that the features upon which applicant relies (i.e., that each step is performed in its entirety before the next step is initiated and no two steps are performed simultaneously) are not recited in the rejected claim. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

While it is true that Roberts does not teach that an entire image is stored in sample-and-hold circuitry 18 at a given time, Roberts *does* disclose an apparatus and method for "storing said electrical signals as analog data" (column 7, lines 4-9). The claim does not include a limitation that precludes the other steps from occurring simultaneously.

8. Applicant's arguments with respect to claim 2 have been considered but are moot in view of the new ground of rejection.

9. Applicant's arguments with respect to claim 19 been fully considered but they are not persuasive.

As Roberts clearly shows in Figure 5A, pixel amplifiers are placed before sample-and-hold circuitry 18. Therefore, this processing occurs before storage.

***Claim Rejections - 35 USC § 102***

10. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

11. Claims 18, 19, 22 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Roberts (U.S. Patent No. 5,576,757).

Regarding claim 18, Roberts discloses a still video camera with a CCD 1 (for "converting an image into electrical signals") shown in Figure 2. The system includes sample-and-hold circuitry 18 for receiving and storing analog data from CCD 1 via pixel multiplexer 7 (Figure 5A) (column 7, lines 7-10). Image data is converted to digital form before being transmitted to processing and compression circuits 10-12, as shown in Figure 5A.

As for claim 19, as shown in Figure 5A, red, green, and blue signals are amplified before being stored in sample-and-hold circuitry 18 (column 7, lines 7-9).

As for claim 22, A/D converters 8 process the image data received from sample-and-hold circuitry 18 only after a conversion completion signal CC has been sent to the A/D converters by the sample-and-hold circuitry 18 (column 7, lines 36-41).

Regarding claim 26, Figure 5A shows that image data is stored in sample-and-hold circuitry 18 is accessed and sent to A/D converters 8 before being transmitted to processing and compression circuits 10-12.

***Claim Rejections - 35 USC § 103***

12. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

13. Claims 1-7, 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi (U.S. Patent No. 5,784,018) in view of Roberts.

Regarding claim 1, Ohmi discloses an imaging device with image sensors (column 1, lines 15-18) that performs image processing (column 1, lines 23-24) on data from the image sensors stored in an "analog or multilevel" format (column 1, lines 25-28).

Ohmi is silent with regard to including compression circuitry.

Roberts discloses a still video camera with a CCD 1 shown in Figure 2. The system includes sample-and-hold circuitry 18 for receiving and storing analog data from CCD 1 via pixel multiplexer 7 (Figure 5A) (column 7, lines 7-10). Image data is processed and transmitted to processing and compression circuits 8 and 10-12, as shown in Figure 5A.

An advantage to compressing image data is that more image data may be saved in the same amount of space. For this reason, it would have been obvious at the time of invention to have Ohmi include image compression circuitry in this imaging device.

Regarding claim 2, both Ohmi and Roberts are silent with regard to the exact size of their respective memories.

The courts have held that "where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

While Ohmi does not specifically teach that the analog or multilevel memories can receive data "at a rate of greater than 10 Mbits/sec for more than 5 seconds and stored more than 50 Mbits of said data", it would have been *prima facie* obvious at the time of invention to do so, as Applicant merely found the optimum memory parameters for use with the imaging device described by Ohmi.

Regarding claim 3, Ohmi teaches that "a large amount of analog data inputted via image sensors" is captured (column 1, lines 15-16).

Regarding claim 4, Ohmi is silent with regard to including an analog-to-digital converter in the image processing and compression circuitry.

Roberts teaches that image data is processed and transmitted to processing and compression circuits 8 and 10-12, wherein part 8 is an A/D converter, as shown in Figure 5A. Advantages to converting data to digital format include less susceptibility to noise and accuracy of reproduction. For these reason, it would have been obvious at the time of invention to have Ohmi include A/D converters among his image processing circuits.

Regarding claim 5, Roberts shows a compression processor 12 in Figures 2 and 5A.

Regarding claim 6, Ohmi is silent with regard to transmitting image data from the memory only when the image processing and compression circuits are available to process image data.

Roberts teaches that A/D converters 8 process the image data received from sample-and-hold circuitry 18 only after a conversion completion signal CC has been sent to the A/D converters by the sample-and-hold circuitry 18 (column 7, lines 36-41).

An advantage to waiting to release image data from memory until processing circuitry sends a "ready" signal is that no data will be "skipped" by the processing circuitry. For this reason, it would have been obvious at the time of invention to have Ohmi's image processing and compression circuitry wait to release image data from memory until the processing circuitry is ready to accept the data.

Regarding claim 7, Ohmi is silent with regard to including the analog or multilevel memory in a digital still camera.

Roberts discloses that his invention is an electronic still video camera (column 1, lines 14-15).

Regarding claim 10, Roberts discloses in column 3, lines 1-3, that Figure 2 is the structure of an electronic still camera. Figure 2 includes image processing and compression circuits 10-12.

Regarding claim 12, Roberts discloses in column 3, lines 1-3, that Figure 2 is the structure of an electronic still camera. Figure 2 includes image processing and compression circuits 10-12, CCD 1, and pixel multiplexer 7. Note that the sample-and-hold circuitry 18 omitted from Figure 2 is shown in Figure 5A.

14. Claims 8, 9, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi in view of Roberts and further in view of Fernandez (U.S. Patent No. 5,644,636).

Claims 8 and 25 may be treated like claims 7 and 1, respectively. However, both Ohmi and Roberts are silent with regard to having the analog memory contained in a removable memory card.

Fernandez shows in Figure 2 an EEPROM 50. The EEPROM may be included as part of a removable card, such as a bankcard for an automated teller machine (column 5, lines 14-17). The EEPROM may be written to with write commands (column 5, lines 39-40). The EEPROM memorizes a level of signal charge in its memory cells

(column 4, lines 54-59), making it an analog memory. The memory may be read via lines 60 and 62.

The advantage to using a removable analog memory is that many analog memories may be used with one recording device, which increases the amount of data that can be stored using one recording device. For this reason, it would have been obvious to have Ohmi's camera include a removable analog memory card.

Regarding claim 9, Fernandez teaches that an analog-to-digital converter 46 may be included on a card with EEPROM 50 (column 5, lines 17-19). The advantage of including an A/D converter on a removable card is that it allows a system that processes digital data to use analog data stored on the card. For this reason, it would have been obvious to have Ohmi's camera include an A/D converter on a removable memory card.

15. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi in view of Roberts and further in view of Anderson (U.S. Patent No. 6,177,956).

This claim may be treated like claim 7. However, both Ohmi and Roberts are silent with regard to placing the image processing and compression circuits outside the camera.

Anderson discloses an imaging device 14 and a computer 18 connected by a bus 16. Computer 18 may be separate imaging device 14 (column 3, lines 49-51). The computer performs image processing and compression on the raw image data received from the camera (column 12, lines 9-11, 15-16, 26-29, and 48-50). An advantage to having an external device perform image processing and compression is that the

external device may have more space for processing circuitry, which decreases the power used by, and the size of, the digital camera. For this reason, it would have been obvious to have Ohmi's imaging system perform image processing and compression outside the camera.

16. Claims 13, 14, 16, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi in view of Roberts and further in view of Simko (U.S. Patent No. 4,989,179).

Regarding claims 13 and 16, Simko discloses an analog signal recording and playback system that includes array 13 with a plurality of columns that act as write pipelines, wherein each column includes multiple non-volatile memory cells (column 3, lines 58-60). Each column includes a write column driver 15 to write data to the cells (column 3, lines 64-66). Cells are programmed using a voltage provided by high voltage source 150, which is shown in Figure 5, to produce a charge in the selected cell (column 10, lines 45-56). The cells may record data using multi-level storage (column 12, lines 43-46). Each column of cells in the array (Figure 3) is used to store data independently (column 5, lines 38-41).

Clock addressing sequencer 22 acts as a timing circuit (column 4, lines 14-30) to drive column drivers 15 sequentially (column 3, lines 64-66). A high voltage source at terminal 150 (Figure 5) provides a programming voltage. The programming voltage is applied incrementally, and comparator 66 (Figure 3) compares the voltage in the cell

with the expected voltage after each increment (column 11, lines 35-56) to verify the contents of the cell.

Official Notice is taken that charge pumps are a common way to produce a voltage higher than a provided supply voltage. Since Simko is silent with regard to how this high voltage is produced, it would have been obvious to use any high voltage generator suitable for programming memory cells, such as a charge pump.

As stated in column 2, lines 17-21, an advantage to using such a memory is that data can be stored in less space. For this reason, it would have been obvious at the time of invention to have Ohmi's camera include Simko's memory.

Regarding claim 14, Simko teaches that the memory cells included in his system can store analog information (column 2, lines 43-46).

Claim 20 may be treated like claim 18. However, Roberts is silent with regard to the data specifications of the analog memory.

Simko discloses an analog signal recording and playback system that uses an array 13 of analog cells (column 2, lines 43-46), as shown in Figure 1. The cells may record data using multi-level storage (column 12, lines 43-46). Each column of cells in the array (Figure 3) is used to store data independently (column 5, lines 38-41). Simko teaches that, "The actual number [of columns] is not preordained, but may be chosen by the practitioner depending on signal quality desired" (column 5, lines 42-44).

More storage space allows the system to record more data at a faster speed. Using enough columns would permit any amount of data to be stored for any length of time. The advantage to using a large, high-speed memory is that it allows the user to

capture an image at a higher resolution. For this reason, it would have been obvious to have Roberts' camera include a high-speed, high-capacity memory, such as the one described by Simko.

17. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi in view of Roberts and further in view of Simko and Chen (U.S. Patent No. 5,867,430).

Claim 17 may be treated like claim 16. However, Simko is silent with regard to using two banks and performing a verification cycle on one while performing a programming operation on the other.

Chen discloses a flash memory device with two banks (Figure 1). Bank 0 and bank 1 are arrays of non-volatile memory cells (column 3, lines 33-35). As one bank is being programmed, the other bank may be read and verified using verify sense amplifier 176 (column 5, lines 38-44).

An advantage to performing simultaneous verification and writing on two banks is that accurate data may be stored at a faster speed than in the case where such operations are performed sequentially. For this reason, it would have been obvious at the time of invention to have Simko's storage system perform simultaneous writing and verification using two banks of memory cells.

18. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts in view of Lin (U.S. Patent No. 5,760,727).

This claim may be treated like claim 18. However, Roberts is silent with regard to transmitting data from the memory when the digital signal processing is available.

Lin teaches an imaging device with a CCD 12 that stores image data in an analog memory array 34, shown in Figure 2. Image data to be processed is converted to a digital signal by A/D converter 14 and sent to host computer 26 (column 3, lines 55-59) only after the computer makes a request (column 3, lines 63-65). This process is detailed in the flowchart of Figure 5.

The advantage of having data transmitted to a processor only upon request is that the processor may operate at varying speeds without losing data or needing a buffer. For this reason, it would have been obvious to have Roberts' imaging system transmit data from memory to a digital processing system upon the processing system's request.

19. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts in view of Wright (U.S. Patent No. 6,172,935).

Claim 23 may be treated like claim 18. However, Roberts is silent with regard to the structure of the memory device used.

Wright discloses a memory device 200 (Figure 3) comprised of memory banks 211A and 211B, each including a plurality of memory cells (column 9, lines 49-55). The system uses charge pump voltage Vccp to select the row to be read (column 64, lines 3-13). A charge is then applied to the cell to produce a certain voltage (column 72, lines 43-47).

When writing data, bits may be alternately programmed into banks 211A and 211B (column 22, lines 35-39). For example, if a first bit is written into bank 211A, a second bit is written into bank 211B, and a third bit is written into 211A, then programming of bank 211B begins after the programming of bank 211A has begun but before it is complete (since the third bit has not yet been written).

An advantage to using a memory system with multiple banks is that both banks may be simultaneously operative, which speeds up storage and retrieval times. For this reason, it would have been obvious at the time of invention to have Roberts include a dual-banked memory system like the one described by Wright.

### *Allowable Subject Matter*

20. Claims 15 and 24 are allowed.

No prior art could be located that teaches or fairly suggests an analog/multi-level memory with a plurality of odd- and even-numbered pipelines that perform simultaneous programming and each using one of two voltages.

### *Conclusion*

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason T. Whipkey, whose telephone number is (703) 305-1819. The examiner can normally be reached Monday through Friday from 9 A.M. to 6:30 P.M. eastern daylight time, alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy R. Garber, can be reached on (703) 305-4929. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communication and (703) 872-9315 for After Final communication.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office, whose telephone number is (703) 306-0377.

Response to this action should be mailed to:

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or faxed to the appropriate number above for communications intended for entry. (For informal or draft communications, please label **"PROPOSED"** or **"DRAFT"**.)

Hand-delivered responses should be brought to the sixth floor receptionist of Crystal Park II, 2121 Crystal Drive in Arlington, Virginia.

JTW
JTW
September 30, 2003

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